



**Appendices**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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## Appendix A

### Formula used in paclobutrazol residue calculation

1. Spiking of paclobutrazol in pulp mango according to the excel sheet form for calculation

A	B	C	D	E	
<b>Artificial enrichment of mango mesocarp (MFF) with PBZ, only for recovery studies (0,7mg PBZ/kg)</b>					
mango mesocarp (MFF)	3	net weight of sample bottle (g), tare	338.765	Formulation of calculation	
	4	sample net weight (g)	102.0165		
	5	dry matter of MFF (g/100g)	12.1		
	6	TSS (°Brix)	15.3		
	7	H <sub>2</sub> O-content of MFF (g/100g)	87.9		100-D5
	PBZ-solution	8	weighed net amount of PBZ (mg)		2.81000
		9	total mass of PBZ-solution (g)		99.15033
10		PBZ-concentration (mg/100g)	2.834		
11		weighed net amount of ACN(g)	3.50400		
12		weighed net amount of H <sub>2</sub> O (g)	95.64352		
	13	intended addition of PBZ (mg)	0.07141	0.7*D4/1000	
	14	intended addition of PBZ-solution (g)	2.51974	D13/D10*100	
	15	real addition of PBZ-solution (g)	2.50000		
	16	final sample net weight MFF <sub>PBZ</sub> (g)	104.3765		
	17	Rinsing water (g)	0.00000		
composition MFF <sub>PBZ</sub> -fresh weight	18	dry matter of MFF (MFF-DM) (g)	12.34	D4*D5/100	
	19	H <sub>2</sub> O-amount (g)	92.08	D4*D7/100+D15*D12/D9+D17	
	20	ACN-amount (g)	0.09	D15*D11/D9	
	21	PBZ-amount (mg)	0.0709	D15*D8/D9	
	22	BDN-DM (g/100g)	11.83	D18*/D16*100	
	23	H <sub>2</sub> O-content (g/100g)	88.22	D19/D16*100	
	24	ACN-content (g/100g)	0.0846	D20/D16*100	
	25	PBZ-content (mg/kg)	0.6788	D21/D16*100	

2. The extraction of paclobutrazol method according to the excel sheet form for calculation

A	B	C	D	E
<b>Sample preparation (in regular analysis and recovery studies)</b>				
28	net weight of extraction bottle with stirring bar (g), tare		335.306	
29	<b>sample net weight (g)</b>		<b>98.3</b>	
<b>Addition of internal standard (0,7mg DBZ / kg sample; sample = fresh MFF in regular analysis):</b>				
DBZ-solution	31	weighed net amount of DBZ (mg)	2.82000	
	32	total mass of DBZ-solution (g)	99.12920	
	33	DBZ-concentration (mg/100g)	2.845	D31/D32*100
	34	weighed net amount of ACN (g)	3.52274	
35	weighed net amount of H <sub>2</sub> O (g)	95.60364	D32-D34-(D31/1000)	
36	intended addition of DBZ (mg)	0.06881	0.7*D29/1000	
37	intended addition of DBZ-solution (g)	2.41882	D36/D33*100	
composition sample P <sub>DBZ</sub>	38	real addition of DBZ-solution (g)	2.43200	
	39	dry matter of MFF (MFF-DM) (g)	11.63	D18/D16*D29
	40	H <sub>2</sub> O-amount (g)	89.07	(D19/D16*D29)+(D38*D35/D32)
	41	ACN-amount (g)	0.17	(D20/D16*D29)+(D34/D32*D38)
	42	DBZ-amount (mg)	0.07	D38*D31/D32
	43	PBZ-amount (mg)	0.0667	D21/D16*D29
	44	MFF-DM (g/100g)	11.54	D39/(D29+D38)*100
	45	H <sub>2</sub> O-content (g/100g)	88.42	D40/(D29+D38)*100
	46	ACN-content (g/100g)	0.1684	D41/(D29+D38)*100
	47	DBZ-content (mg/kg)	0.0687	D42/(D29+D38)*100
	48	PBZ-content (mg/kg)	0.0662	D43/(D29+D38)*100
<b>Sample extraction (target: 100g MFF, (100-x) g H<sub>2</sub>O, 200 g ACN) : --&gt; "33.3% H<sub>2</sub>O : 66.7% ACN"</b>				
51	weighed net amount of sample P <sub>DBZ</sub> (g)	100.7320	D29+D38	
52	weighed net amount of Celite 503, 545 (g)	20.0000		
53	intended addition of H <sub>2</sub> O (g), net weight	10.9313	100-D40	
54	intended addition of ACN (g), net weight	199.8304	200-D41	
55	theoretical total net weight of extract (g)	300.0000	D54+D53+D41+D40	
56	total net weight of sample + added substances (g)	331.4937	SUM(D51:54)	
57	ACN (%), nominal percentage	66.7	(D54+D41)/D55*100	
58	H <sub>2</sub> O (%), nominal percentage	33.3	(D53+D40)/D55*100	
59	PBZ (mg/kg extract), nominal	0.222	D43/D55*1000	
60	DBZ (mg/kg extract), nominal	0.231	D42/D55*1000	
<b>Vacuum filtration</b>				
63	net weight of extract bottle (g), tare	777.280		
64	total weight of crude extract + extract bottle (g)	1037.240		
65	net weight of crude extract (g)	259.960	D64-D63	
66	achieved yield of crude extract (%)	86.7	D65/D55*100	
<b>Washing of the solid filtration residue</b>				
ACN:H <sub>2</sub> O 66.7:33.3	69	weighed net amount of ACN (g)	99.996	
	70	weighed net amount of H <sub>2</sub> O (g)	50.660	
	71	total net weight of solvent (g)	150.656	SUM(D69:D70)
72	total solvent volume used for washing of extraction bottle and filtration residue (ml)	30.000		

73	weight of washed extract + extract bottle (g)	1041.870	
74	net weight of washed extract (g)	264.590	D73-D63
75	achieved yield of washed extract (%)	101.781	D74/D65*100
76	mass of recovered solvent used for washing (g)	4.630	D74-D65
77	ACN (%)	66.662	$((D54+D41)/D55*D65/D74)+(D69/D71*D76)/D74*100$
78	H <sub>2</sub> O (%)	33.338	$((D53+D40)/D55*D65/D74)+(D70/D71*D76)/D74*100$
79	PBZ (mg/kg washed extract)	0.252	D43/D74*1000
80	DBZ (mg/kg washed extract)	0.261	D42/D74*1000
<b>Partial concentration of the washed extract (--&gt; nearly complete removal of ACN)</b>			
83	Weighed amount of washed extract for concentration(g)	262.6030	D86-D85
84	aliquot of washed extract for concentration (g)		
85	net weight of round-bottom flask (g), tare	169.0670	
86	total weight of flask + washed extract (g)	431.6700	
87	intended weight of concentrated extract(g),-66.5%	87.9720	D83-(D83*66.5/100)
88	total weighed of flask + concentrated extract (g)	258.3100	
89	net weight of concentrated extract (g)	89.2430	D88-D85
90	included ACN-amount after concentration (g)	1.6952	D89-(D78*D83/100)
91	added amount of ACN (g)	1.4801	$(D89*0.035-D90)/(1-0.035)$
92	net weight of the final extract (g)	90.7231	D89+D91
final extract	93	ACN-content (g/100g)	3.50 $(D91+D90)/(D92)*100$
	94	H <sub>2</sub> O-content (g/100g)	96.50 $(D83*D78/100)/(D92)*100$
	95	DBZ-content (mg/ kg final extract)	0.757 $(D80/1000)*(D83/D92)*1000$
	96	PBZ-content (mg/ kg final extract)	0.730 $(D79/1000)*(D83/D92)*1000$

3. Calculation of the peak areas from GC-MS to find out the real concentration of paclobutrazol in mango pulp.

A	B	C	D	E
<b>Pretreatment of the final extract for SPME (= preparation of the injected solution)</b>				
	101	net weight of the 10 ml-volumetric flask (g), tare	15.268	
	102	volume of the final extract used for dilution (ml)	1	
	103	corresponding net weight of the final extract (g)	0.966	
	104	final volume of the diluted extract solution (= injected solution) (ml)	10	
	105	corresponding net weight of the injected solution (g)	9.826	25.094-D101
SPME-Vial	106			
	107	injected solution (containing 96,5% H <sub>2</sub> O) (ml)	1.2	
	108	NaCl (mg)	400	
<b>Calculation of results:</b>				
A	B	C	D	E
	112	weighed net amount of MFF, fresh weight (g)	98.3	D29
	113	corresponding amount of washed extract (g)	264.5900	D74
	114	corresponding amount of concentrated extract (g)	89.9183	D89*D113/D83
	115	corresponding amount of final extract (g)	91.4096	D92*D114/D89
	116	corresponding amount of injected solution (g)	929.8037	D105*D115/D103
	117	corresponding volume of injected solution (L)	0.9463	(D104/1000)*D116/D105
	118	MFF, fresh weight (g/L) (KR: MFF <sub>PBZ</sub> in (g/ L)	103.8817	D112/D117
	119	Area 294+236+125	1370788	
	120	C <sub>PBZ</sub> (mg/L)	0.083	EXP(D122)
	121	Area (A)	1370788	
	122	ln C (from the power law calibration curve)	-2.490	(D123-16.4)/0.9114
	123	ln A	14.131	LN(D121)
	124	<b>C<sub>PBZ</sub> (mg / kg fresh MFF)</b>	<b>0.7984</b>	D120*1000/D118
	125	theor. mg PBZ / kg fresh MFF <sub>PBZ</sub>	0.6788	D25
	126	<b>recovery</b>	<b>117.6</b>	D124/D125*100
	127	<b>mean recovery %</b>	<b>117.6</b>	AVERAGE(D126:G126)
	128			
	129			D120*1000/(D29/D74* D83/D89*D89/D92* D103/D105*1 /(D104/1000)*D105)
		<b>Control calculation:</b>	<b>0.7984</b>	
	130	<b>mg PBZ / kg fresh MFF<sub>PBZ</sub></b>		
	131	<b>Result with respect to dry mango matter:</b>		
	132	MFF-DM (g/L)	12.2855	D118*D22/100
	133	<b>mg PBZ / kg MFF-DM</b>	<b>6.7507</b>	D120*1000/D132
	134	theory. mg PBZ / MFF-DM	5.7398	D25*100/D22
	135	<b>recovery</b>	<b>117.6</b>	D133/D134*100
	136	<b>mean recovery %</b>	<b>117.6</b>	AVERAGE(D135:G135)

## Appendix B

### Raw data of paclobutrazol residue analysis in soil and mango

#### Raw data for the graphs and charts

**Table 1** Paclobutrazol integrated by only ion 236 (0.001 – 0.5 µg/ml)

Concentration ( µg/ml)	Peak area of paclobutrazol by ion 236			Mean Peak area	S.D.	CV (%)
	Rep.1	Rep.2	Rep.3			
0.001	1.987	2.319	2.301	2.202	0.19	8.48
0.005	7.133	6.833	5.765	6.577	0.72	10.93
0.01	19.272	16.434	12.325	16.010	3.49	21.82
0.05	39.862	42.856	46.095	42.938	3.12	7.26
0.1	53.307	56.137	57.009	55.484	1.94	3.49
0.5	89.023	105.864	109.336	101.408	10.87	10.71

**Table 2** Paclobutrazol integrated by only ion 294 + 236 + 125 (0.001 – 0.5 µg/ml)

Concentration ( µg/ml)	Peak area of paclobutrazol by three ions			Mean Peak area	S.D.	CV (%)
	Rep.1	Rep.2	Rep.3			
0.001	3.447	4.210	4.236	3.964	0.45	11.31
0.005	12.033	12.366	10.219	11.539	1.16	10.01
0.01	32.954	28.446	21.371	27.590	5.84	21.16
0.05	97.888	91.838	93.558	94.428	3.12	3.30
0.1	171.292	157.340	139.645	156.092	15.86	10.16
0.5	849.955	823.730	965.785	879.823	75.59	8.59

**Table 3** Paclobutrazol integrated by RICs (0.001 – 0.5 µg/ml)

Concentration ( µg/ml)	Peak area of paclobutrazol by RICs			Mean Peak area	S.D.	CV (%)
	Rep.1	Rep.2	Rep.3			
0.001	2.824	10.755	8.895	7.491	4.15	55.37
0.005	32.020	38.385	30.963	33.789	4.01	11.88
0.01	91.190	81.149	80.960	84.433	5.85	6.93
0.05	289.727	288.234	268.203	282.055	12.02	4.26
0.1	459.786	479.689	420.568	453.348	30.08	6.64
0.5	1722.134	1708.546	1803.562	1744.747	51.39	2.95

**Table 4** Paclobutrazol integrated by 294 + 236 + 125 (0.001 – 0.5 µg/ml) and the recovery of PBZ/DBZ ratio between peak area and concentration.

Concentration of PBZ (µg/ml)	Peak area 294+236+125	Concentration of DBZ (µg/ml)	Peak area 270+272+159	Recovery of concentration (PBZ/DBZ)	Recovery of peak area (PBZ/DBZ)
0.001	0.849	0.05	171.136	0.02	0.00496
0.005	7.314	0.05	165.168	0.1	0.04428
0.01	16.102	0.05	167.912	0.2	0.09590
0.05	62.353	0.05	165.432	1	0.37691
0.1	99.790	0.05	134.864	2	0.73993
0.2	164.142	0.05	141.744	4	1.15802
0.4	297.025	0.05	136.700	8	2.17282
0.5	412.404	0.05	133.346	10	3.09274



**Table 5** Absorption time profile which used interval time 30 – 90 minutes for paclobutrazol combined with diclobutrazol by direct-SPME using 85 µm PA fiber was analysed.

No.	Level	Absorp.	Desorp.	Area				Area					
		time	time	PBZ(µg/ml)	294+236+125	Factor	Conc.	DBZ(µg/ml)	270+272+159	Factor	Conc.	DBZ/PBZ	PBZ/DBZ
1	30min_1	30	6	0.05	140.0850	0.7981	0.0778	0.05	255.6710	0.9907	0.1420	1.8251	0.5479
2	40min_1	40	6	0.05	111.9000	0.6376	0.0622	0.05	233.9010	0.9063	0.1299	2.0903	0.4784
3	40min_2	40	6	0.05	113.7730	0.6482	0.0632	0.05	233.8480	0.9061	0.1299	2.0554	0.4865
4	45min_1	45	6	0.05	175.5140	1.0000	0.0975	0.05	258.0710	1.0000	0.1434	1.4704	0.6801
5	45min_2	45	6	0.05	178.6490	1.0179	0.0992	0.05	284.0750	1.1008	0.1578	1.5901	0.6289
6	50min_1	50	6	0.05	124.7930	0.7110	0.0693	0.05	271.9050	1.0536	0.1511	2.1788	0.4590
7	50min_2	50	6	0.05	138.8180	0.7909	0.0771	0.05	309.1190	1.1978	0.1717	2.2268	0.4491
8	55min_1	55	6	0.05	203.9910	1.1622	0.1133	0.05	402.6680	1.5603	0.2237	1.9739	0.5066
9	55min_2	55	6	0.05	162.3320	0.9249	0.0902	0.05	358.1570	1.3878	0.1990	2.2063	0.4532
10	60min_1	60	6	0.05	173.5780	0.9890	0.0964	0.05	347.8650	1.3479	0.1933	2.0041	0.4990
11	60min_2	60	6	0.05	205.9970	1.1737	0.1144	0.05	379.1260	1.4691	0.2106	1.8404	0.5433
12	65min_1	65	6	0.05	183.5920	1.0460	0.1020	0.05	349.8240	1.3555	0.1943	1.9054	0.5248
13	65min_2	65	6	0.05	147.2520	0.8390	0.0818	0.05	313.9310	1.2165	0.1744	2.1319	0.4691
14	75min_1	75	6	0.05	204.1900	1.1634	0.1134	0.05	368.8030	1.4291	0.2049	1.8062	0.5537
15	75min_2	75	6	0.05	155.8120	0.8877	0.0866	0.05	361.2310	1.3997	0.2007	2.3184	0.4313
16	75min_3	75	6	0.05	154.7270	0.8816	0.0860	0.05	332.0480	1.2867	0.1845	2.1460	0.4660
17	90min_1	90	6	0.05	195.6230	1.1146	0.1087	0.05	355.3300	1.3769	0.1974	1.8164	0.5505
18	90min_2	90	6	0.05	187.6800	1.0693	0.1043	0.05	369.8850	1.4333	0.2055	1.9708	0.5074

**Table 6** Desorption time profiles which used interval time 2 – 14 minutes for paclobutrazol combined with diclobutrazol by direct-SPME using 85 µm PA fiber was analysed; two differences of absorption time were 45 and 60 minutes.

No.	Level	Absorp.	Desorp.	PBZ(µg/ml)	Area			Area					
		time	time		294+236+125	Factor	Conc.	DBZ(µg/ml)	270+272+159	Factor	Conc.	DBZ/PBZ	PBZ/DBZ
1	02min_1	2	45	0.05	161.9330	1.1911	0.0900	0.05	258.4270	0.9601	0.1436	1.5959	0.5327
2	04min_1	4	45	0.05	5.3680	0.0395	0.0030	0.05	26.1160	0.0970	0.0145	4.8651	0.5051
3	04min_2	4	45	0.05	179.8890	1.3232	0.0999	0.05	243.8580	0.9060	0.1355	1.3556	0.5400
4	B45min_1	6	45	0.05	2.5000	0.0184	0.0014	0.05	5.1660	0.0192	0.0029	2.0664	0.5282
5	45min_1	6	45	0.05	175.5140	1.2910	0.0975	0.05	258.0710	0.9588	0.1434	1.4704	0.5310
6	06min_1	6	45	0.05	126.2880	0.9289	0.0702	0.05	237.0770	0.8808	0.1317	1.8773	0.4652
7	06min_2	6	45	0.05	100.7170	0.7408	0.0560	0.05	213.8380	0.7945	0.1188	2.1232	0.4778
8	06min_3	6	45	0.05	178.6490	1.3140	0.0992	0.05	284.0750	1.0554	0.1578	1.5901	0.4205
9	07min_1	7	45	0.05	103.6540	0.7624	0.0576	0.05	222.8050	0.8278	0.1238	2.1495	0.4665
10	08min_1	8	45	0.05	135.9530	1.0000	0.0755	0.05	269.1620	1.0000	0.1495	1.9798	0.4710
11	08min_2	8	45	0.05	112.3330	0.8263	0.0624	0.05	267.1240	0.9924	0.1484	2.3780	0.5568
12	08min_3	8	45	0.05	99.4220	0.7313	0.0552	0.05	178.5450	0.6633	0.0992	1.7958	0.2055
13	B08min_4	8	45	0.05	3.8960	0.0287	0.0022	0.05	22.3760	0.0831	0.0124	5.7433	0.1741
14	08min_5	8	45	0.05	191.9260	1.4117	0.1066	0.05	321.1630	1.1932	0.1784	1.6734	0.7377
15	09min_1	9	45	0.05	104.6580	0.7698	0.0581	0.05	219.0480	0.8138	0.1217	2.0930	0.6289
16	10min_1	10	45	0.05	122.6110	0.9019	0.0681	0.05	227.0630	0.8436	0.1261	1.8519	0.5976
17	10min_2	10	45	0.05	93.5770	0.6883	0.0520	0.05	200.6010	0.7453	0.1114	2.1437	0.6266
18	12min_1	12	45	0.05	120.1770	0.8840	0.0668	0.05	227.5140	0.8453	0.1264	1.8932	0.4839

No.	Level	Absorp.	Desorp.	PBZ( $\mu\text{g/ml}$ )	Area			Area			DBZ/PBZ	PBZ/DBZ	
		time	time		294+236+125	Factor	Conc.	DBZ( $\mu\text{g/ml}$ )	270+272+159	Factor			Conc.
19	14min_1	14	45	0.05	120.5970	0.8870	0.0670	0.05	227.1130	0.8438	0.1262	1.8832	0.6801
20	6min60_1	6	60	0.05	173.5780	-	-	0.05	347.8650	-	-	-	-
21	6min60_2	6	60	0.05	205.9970	-	-	0.05	379.1260	-	-	-	-
22	6min60_4	6	60	0.05	109.8230	-	-	0.05	260.2630	-	-	-	-
23	6min60_5	6	60	0.05	148.2800	-	-	0.05	334.9490	-	-	-	-
24	8min60_6	8	60	0.05	138.2610	-	-	0.05	246.7220	-	-	-	-
25	8min60_7	8	60	0.05	125.5640	-	-	0.05	275.2540	-	-	-	-

**Table 7** Clean up time profiles of SPME fiber at different interval time from 0 – 60 minutes with calculates in percentage of remain peak areas was evaluated.

Level	Clean. time	Absorp. time	Desorp. time	PBZ( $\mu\text{g/ml}$ )	Area			Area					
					294+236+125	Factor	Conc.	DBZ( $\mu\text{g/ml}$ )	270+272+159	Factor	Conc.	DBZ/PBZ	PBZ/DBZ
STDQ5_1		60	6	0.10	430.811	100	0.239339	0.05	434.972	100	0.242	1.0097	0.9904
B_AHZ00	0		6	0.10	4.354	1.011	0.002419	0.05	3.469	0.798	0.002	0.7967	1.2551
STDQ5_5		60	6	0.10	370.69	100	0.205939	0.05	339.69	100	0.189	0.9164	1.0913
B_AHZ05	5		6	0.10	1.966	0.530	0.001092	0.05	2.013	0.593	0.001	1.0239	0.9767
STDQ5_2		60	6	0.10	478.312	100	0.265729	0.05	423.673	100	0.235	0.8858	1.1290
B_AHZ10	10		6	0.10	0.789	0.165	0.000438	0.05	0.276	0.065	0.000	0.3498	2.8587
STDQ5_8		60	6	0.10	486.031	100	0.270017	0.05	405.807	100	0.225	0.8349	1.1977
B_AHZ102	10		6	0.10	0.566	0.116	0.000314	0.05	0.112	0.028	0.000	0.1979	5.0536
STDQ5_10		60	6	0.10	520.993	100	0.289441	0.05	456.357	100	0.254	0.8759	1.1416
B_AHZ103	10		6	0.10	0.070	0.013	3.89E-05	0.05	0.000	0.000	0.000	0.0000	0.0000
STDQ5_3		60	6	0.10	538.889	100	0.299383	0.05	448.346	100	0.249	0.8320	1.2019
B_AHZ30	30		6	0.10	0.659	0.122	0.000366	0.05	1.129	0.252	0.001	1.7132	0.5837
STDQ5_4		60	6	0.10	511.754	100	0.284308	0.05	451.743	100	0.251	0.8827	1.1328
B_AHZ60	60		6	0.10	1.174	0.229	0.000652	0.05	1.039	0.230	0.001	0.8850	1.1299

**Table 8** Stability of paclobutrazol in soil samples under sterilized condition 121 °C, 20 minutes.

Sample	Concentration of PBZ	Theoretical	Recovery	Mean	S.D. Recovery	S.D. Concentration
	(mg/kg dry soil)	(mg/kg)	(%)	Recovery		
Control-1	0.6465	0.7080	91.30	104.7	12.39	0.088
	0.8198	0.7080	106.90			
	0.7573	0.7080	115.80			
Control-2	0.6464	0.6912	93.50	107.2	12.69	0.009
	0.7572	0.6912	109.50			
	0.8197	0.6912	118.60			
S1	0.7264	0.6982	104.00	103.1	1.36	0.009
	0.7129	0.6982	102.10			
S2	0.5487	0.6987	78.50	97.9	27.34	0.191
	0.8188	0.6987	117.20			
S3	0.7264	0.6819	106.50	105.5	1.39	0.009
	0.7129	0.6819	104.60			

**Table 9** Recovery percentage of optimizing extract time in extraction soil procedure.

Time (min)	Soil																						
	Concentration of paclobutrazol (mg/kg dry soil)																						
	Inj-1	Inj-2	Inj-3	Inj-4	Inj-5	Inj-6	Inj-7	Inj-8	Mean 1	S.D.1	CV 1	Mean 2	S.D.2	CV 2	Mean 3	S.D.3	CV 3	Mean 4	S.D.4	CV 4	Mean Total	S.D. Total	CV Total
10	0.53	0.64	0.42	0.40	0.39	0.36	0.46	0.44	0.59	0.07	12.39	0.41	0.02	4.06	0.37	0.02	5.92	0.45	0.01	2.73	0.45	0.09	19.94
30	0.99	1.10	0.95	0.93	0.91	0.90	-	-	1.05	0.08	8.04	0.94	0.02	1.69	0.91	0.01	0.97	-	-	-	0.96	0.07	7.76
60	0.52	0.46	0.54	0.44	0.49	0.43	0.40	0.32	0.49	0.05	9.45	0.49	0.06	13.17	0.46	0.04	9.37	0.36	0.06	16.88	0.45	0.07	15.40

**Table 10** Linearity plot of paclobutrazol standard addition method.

PBZ (mg/kg)	Injection-1	Injection-2	Injection-3	Injection-4	Mean 1	S.D. 1	CV 1	Mean 2	S.D. 2	CV 2	Mean Total	S.D. Total	CV Total
0.5	0.3116	0.3353	0.3722	0.3592	0.3235	0.017	5.19	0.3657	0.009	2.52	0.3446	0.027	7.77
0.1	0.0892	0.0875	0.0711	0.0931	0.0883	0.001	1.41	0.0821	0.016	18.92	0.0852	0.010	11.37
0.05	0.0379	0.0272	0.0398	0.0380	0.0325	0.008	23.21	0.0389	0.001	3.40	0.0357	0.006	16.11
0.01	0.0070	0.0078	0.0079	0.0079	0.0074	0.001	8.05	0.0079	0.000	0.32	0.0076	0.000	5.69

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**Table 11** Recovery percentage for optimizing extract time in extraction mango procedure.

Time (min)	Mango												
	Concentration of paclobutrazol (mg/kg mesocarp)												
	Injection-1	Injection-2	Injection-3	Injection-4	Mean 1	S.D.1	CV 1	Mean 2	S.D.2	CV 2	Mean Total	S.D. Total	CV Total
10	0.5627	0.5752	0.7879	0.8916	0.5690	0.01	1.55	0.8398	0.07	8.74	0.7044	0.16	23.01
20	0.6461	0.6622	0.7793	0.6491	0.6541	0.01	1.74	0.7142	0.09	12.90	0.6842	0.06	9.33
30	0.7577	0.7474	0.7681	0.8018	0.7525	0.01	0.97	0.7849	0.02	3.04	0.7687	0.02	3.07
45	0.7517	0.7829	0.8622	0.8879	0.7673	0.02	2.88	0.8751	0.02	2.08	0.8212	0.06	7.84
60	0.8671	1.0388	0.7926	0.7802	0.9530	0.12	12.74	0.7864	0.01	1.12	0.8697	0.12	13.69

**Table 12** Recovery percentage of additive paclobutrazol as affected by various mango cultivars Kent, Haden, and Palmer

Kent cultivar (Peru)	Extraction-1	Extraction-2	Extraction-3	Extraction-4	Extraction-5	Mean
Injection 1	0.7207	0.5985	0.5480	0.5160	0.4397	0.5646
Injection 2	0.6127	0.6512	0.5853	0.4804	0.7002	0.6060
Mean	0.6667	0.6248	0.5667	0.4982	0.5699	0.5853
S.D.	0.08	0.04	0.03	0.03	0.18	0.09
CV (%)	11.44	5.97	4.65	5.06	32.32	15.62
Haden cultivar (Peru)						
Injection 1	0.7182	0.5876	0.4892	-	-	0.5983
Injection 2	0.7568	0.6288	0.5117	-	-	0.6324
Mean	0.7375	0.6082	0.5005	-	-	0.6154
S.D.	0.03	0.03	0.02	-	-	0.11
CV (%)	3.70	4.80	3.18	-	-	17.53
Palmer cultivar (Brazilian)						
Injection 1	0.4959	0.4229	0.3976	-	-	0.4388
Injection 2	0.3792	0.4021	0.4847	-	-	0.4220
Mean	0.4375	0.4125	0.4411	-	-	0.4304
S.D.	0.08	0.01	0.06	-	-	0.05
CV (%)	18.85	3.56	13.97	-	-	11.28



**Table 13** Recovery percentage of additive paclobutrazol as affected by Tommy Atkins mango in ripening stage

Date	Injection-1	Injection-2	Injection-3	Injection-4	Mean 1	S.D.1	CV 1	Mean 2	S.D.2	CV 2	Mean Total	S.D. Total	CV Total
0	0.7688	0.6663	0.5810	0.5929	0.7175	0.07	10.10	0.59	0.01	1.43	0.6523	0.09	13.24
1	0.6849	0.7260	0.6493	0.5961	0.7055	0.03	4.11	0.62	0.04	6.04	0.6641	0.06	8.30
2	0.6997	0.6641	0.5339	0.7960	0.6819	0.03	3.69	0.66	0.19	27.87	0.6734	0.11	16.10
3	0.6513	0.6653	0.4849	0.8050	0.6583	0.01	1.50	0.64	0.23	35.09	0.6516	0.13	20.11
4	0.6057	0.5697	0.5141	0.5802	0.5877	0.03	4.33	0.55	0.05	8.54	0.5674	0.04	6.81
7	0.5749	0.5621	0.5885	0.6345	0.5685	0.01	1.59	0.61	0.03	5.33	0.5900	0.03	5.35

**Table 14** Stability of SPME fiber controlling by daily standard injection of peak areas

Code	Injection	PBZ/c:0.01mg/L		DBZ/c:0,1mg/L	
		Area 294+236+125	Time (day)	Area 272+270+159	
T001_110	2	613343	1	4157328	
T001_111	3	763387	2	5098366	
T001_112	6	651253	3	5421511	
T001_113	11	639062	4	6529473	
T001_114	17	656312	5	5594149	
T001_115	23	669508	6	5676558	
T001_116	26	685947	7	5742902	
T001_117	32	714033	8	6048135	
T001_118	37	609806	9	6285495	
T001_119	40	744440	10	6717919	
T001_120	45	703726	11	6124845	
T001_121	48	768842	12	5983112	
T001_122	51	740780	13	5200846	
T001_123	54	720465	14	6514231	
T001_124	57	736216	15	5990421	
T001_125	60	744513	16	6444646	
T001_126	64	851220	17	6820022	
T001_127	68	807468	18	7002761	
T001_128	73	896655	19	7145749	
T001_129	79	719465	20	6736184	
T001_130	84	799164	21	6978425	
T001_131	86	741014	22	6088324	
T001_132	92	369506	23	4010529	
T001_133	93	361382	23	4010529	

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